



THERMAL COMFORT MODELLING REPORT

**Proposed Wellness Clinic and Residential Flats,
Highgate Care Centre**

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1.0 Introduction

This report has been prepared to detail the thermal comfort modelling undertaken on the proposed for the proposed Wellness Clinic and Residential Flats development at Highgate Care Centre.

The report has been prepared with the aim of evaluating the risk of overheating of the proposed design, including services and fabric/window proposals, and demonstrating compliance with TM52, TM59 (bedrooms only) and Part O of the Building Regulations.

Thermal modelling has been undertaken using EDSL Tas software, with the analysis carried out in accordance with CIBSE AM11 Building Performance Modelling 2015 to validate compliance.

The modelling and calculations have been produced based upon the parameters and assumptions detailed within this report.

2.0 Description of the Development

The development consists of a 50 bedroom residential care facility plus communal facilities such as dining, circulation, assisted bathing, etc., as well as support and facilities accommodation such as offices, centralised laundry and kitchen, staff and plant areas.

Adjacent to this is an apartment block containing 9No. residential units.

During the early stages, the building layout has been carefully considered to maximise the site potential and provide the optimal operational layout for a residential care facility.

The layout of the proposed development is typical of modern care home buildings, with shallow plan rooms either side of centralised corridor areas to maximise natural light and natural ventilation opportunities.

The buildings have been orientated on the site to give maximum consideration to the use of natural light (in order to reduce lighting energy load as far as practicable) while still meeting the operational requirements of the development.

3.0 Modelling Methodology

Using the RM Design Group architectural drawings current at the time of writing and this submission, a fully detailed model was produced in EDSL Tas version 9.5.7.

The model was created by a fully qualified Level 5 low carbon energy assessor, accredited via the software provider and CIBSE. The assessor is a Chartered Engineer, with over 25 years experience in building services design, and an independent consultant not professionally connected to a single low and zero carbon technology or manufacturer.

Assessments were undertaken to assess the building for thermal comfort in line with the guidance and methodology detailed in CIBSE TM52:2013 as required by BREAM guidance relating to credit .

TM52 2013

The main purpose of the CIBSE TM52 overheating assessment methodology is to ensure thermal comfort analysis within residential and non-residential buildings. The analysis is carried out for every occupied zone within the building to test if the room temperature is within a comfortable range or if it is overheating. Analysis looks at the occupancy period (on an hourly basis) during the summer period.

There are three criteria for TM52 overheating analysis. Each occupied zone must pass at least two of the three criteria. The room's operative and maximum temperature plays an important role in overheating analysis.

1. The number of hours where the internal operative temperature is above the maximum acceptable temperature.
2. The daily weighted exceedance
3. The maximum operative temperature.

TM59 2017 (Care Home Bedrooms, Apartment Bedrooms and Lounges)

The CIBSE TM59 overheating assessment methodology is aimed specifically at residential buildings, and as such has been applied to all bedrooms within the development.

The overheating criteria establishes the amount of time that a room is assessed to exceed an established maximum comfort temperature. The maximum comfort temperature is determined using an equation taking account of the weighted running mean of outside air temperatures.

The TM59 code also requires the internal temperature of bedrooms to not exceed 26°C for more than 1% of the annual hours during the time period 22.00-07.00.

4.0 Building Fabric and Services Input Parameters

4.1 Care Home

Building Fabric

The following u-values have been assumed as part of this assessment in line with the Part L assessment for the building:

Element	Proposed Value (W/m².K)
External Walls	0.21
Floors	0.10
Roofs	0.12
Windows	1.3 (0.32 g value)

External windows and doors have been modelled to represent the information and opening sections as detailed on the elevations. Windows have been modelled with the assumption that 100mm restrictors will be fitted throughout. External doors day space areas have also assumed can be opened and utilised during the daytime for natural ventilation where required. External doors to ground floor bedrooms have been modelled as closed in order to avoid any security risks with these being left open, however would also be available for residents/staff/visitors to use as supplementary benefit to the findings in this report if this can be managed operationally.

Building Services

Internal design temperatures and servicing strategy have been assumed in line with the project energy strategy report and performance specification.

The ensembles will be provided with local extract fans to meet or exceed part F ventilation rates in a trickle and boost arrangement.

Ventilation to wet/utility room areas (i.e. assisted bathrooms, sluices, WCs etc) shall be provided locally via ceiling mounted/local extract fans. All ventilation rates shall meet or exceed Building Regulation Part F requirements, and if necessary ventilation rates will be boosted to achieve Part O compliance.

Heat recovery ventilation shall be provided to day spaces to provide background ventilation at a rate of 2 air changes per hour, and to landlocked areas which do not have opening windows due to the building layout at a rate of 4 air changes per hour (i.e. nurse stations).

Resident corridors shall be provided with positive supply ventilation at a rate of 2 air changes per hour.

Heating is generally provided by underfloor heating throughout, fed from high efficiency air source heat pumps. Comfort cooling is to be provided to the following areas via ceiling cassettes or wall mounted units:

- Lounges
- Dining Rooms
- Café
- Reception/Foyer
- Kitchen
- Laundry
- Medical Stores
- Comms Room

All bedrooms shall also be provided with comfort cooling via a concealed fan coil unit.

4.2 Residential Units

Building Fabric

The following u-values have been assumed as part of this assessment in line with the Part L assessment for the building:

Element	Proposed Value (W/m ² .K)
External Walls	0.16
Floors	0.10
Roofs	0.10
Windows	0.85 (0.32 g value)

External windows and doors have been modelled to represent the information and opening sections as detailed on the elevations.

Equally, uncontrolled ventilation losses should be limited and the new building constructed to meet stringent air permeability targets. Whilst Part L minimum requirements are 10m³/m²/hr at 50Pa, the notional building used for analysis includes a significantly lower rate (3m³/m²/hr at 50Pa), therefore it would be advantageous for the project to target an improvement over the limiting value. A rate of 3m³/m²/hr at 50Pa has been assumed for the purpose of this analysis based on what is considered an achievable value with the proposed constructions and unit sizes.

Building Services

Internal design temperatures and servicing strategy have been assumed in line with the project energy strategy report and performance specification.

Heating will be provided by high efficiency reversible air source heat pumps, generally serving underfloor heating and domestic hot water throughout the dwelling. The proposed units are reversible and will also provide cooling to the bedrooms and lounges.

Each dwelling shall generally be mechanically ventilated via a dedicated MVHR heat recovery ventilation unit located in the roof space to provide back ground ventilation, as well as a boost function as required. Opening windows will be provided to provide purge and additional ventilation where practicable.

High efficiency/LED lighting has been assumed throughout.

5.0 Thermal Comfort

5.1 Compliance Requirements

Compliance was assessed in accordance with CIBSE TM52:2013, which requires compliance with two of the three following criteria:

Criteria 1 - Hours of Exceedance (H_e):

The number of hours (H_e) during which ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of occupied hours.

Criteria 2 – Daily Weighted Exceedance (W_e):

To allow for the severity of overheating the weighted Exceedance (W_e) shall be less than or equal to 6 in any one day.

Where $W_e = (\sum h_e) \times WF = (h_{e0} \times 0) + (h_{e1} \times 1) + (h_{e2} \times 2) + (h_{e3} \times 3)$

Where the weighting factor $WF = 0$ if $LIT \leq 0$, otherwise $WF = LIT$, and h_{ey} = time in hours when $WF=y$

The value of 6 is an initial assessment of what constitutes an acceptable limit of overheating on any single day.

Criteria 3 - Upper Limit Temperature (T_{upp}):

To set an absolute maximum value for the indoor operative temperature the value of LIT shall not exceed 4K.

The results of this assessment are provided and discussed later in this report.

5.2 Weather Data

The NCM London LWC_DSY1 weather file has been utilised for this analysis, as this was deemed the closest and most appropriate file for this location for the purposes of this assessment, and is the recommended weather file for this location as defined in TM59.

Further assessments have been undertaken using the London LWC/DSY2 and 3 to reflect more extreme scenarios.

5.3 Internal Conditions

Where appropriate NCM room type/conditions have been utilised to form the basis of the internal conditions modelled, modified as appropriate to represent the building and use and in alignment with the heat gains etc. dictated under TM59.

Lighting installed power densities have been adjusted to represent the proposed design, as have ventilation rates and heating and cooling (where applicable) set points in line with the strategy detailed above.

5.4 Apertures

Openings are a key function in a naturally ventilated building in order to prevent or minimise overheating. The following aperture details have been assumed:

- Opening parameters have been modelled in line with TM59 guidance.
- External windows have been modelled to represent the information and opening sections as detailed on the elevations. In line with the planning stage reports, significant noise levels from

the roads that run past the site means windows cannot be opened. In line with the approved planning reports, active cooling is proposed to provide comfort to occupants acoustically and thermally.

- External doors to day spaces have been modelled to represent the information and opening sections as detailed on the elevations.
- External doors to bedrooms have been modelled closed for the purposes of this assessment given the nature of the development.
- Internal cross corridor doors, and the doors to areas such as the dining rooms and communal lounge areas have been modelled as open during the peak summer months as part of the thermal comfort analysis. Where there is a secure line to be maintained, i.e. to staff areas, to staircases, either side of the reception area, etc. these corridor doors have been modelled as closed.
- Internal doors to bedrooms have been modelled closed for the purposes of this assessment given the nature of the development.
- Doors to secure rooms such as the staff room, nurse, managers and admin offices were assumed to be open when occupied as part of the thermal comfort model, this needs to be managed to maintain security when not occupied.

5.5 TM52/TM59 Categorisation

Given the facility provides an element of residential care, the whole of the development (including the apartments) has been assessed under a Category I assessment (which is the most onerous).

5.6 Limitations of the assessment

The thermal comfort analysis has been carried out using EDSL Tas version 9.4.6 in accordance with CIBSE AM11. The parameters and assumptions used in this calculation are deemed to be accurately represent the building to the best of our knowledge and our experience of similar care home buildings.

Although every effort has been made to simulate the building on anticipated heat gain values and occupancy profiles, the 'real' building may have differing operations and heat gain patterns with external weather conditions not normal to the historical data provided by the standard CIBSE weather files. It therefore should be noted that there is no guarantee that the thermal comfort assessment will match the occupied building. The building will also need to be managed to ensure that windows are opened to mitigate the impacts of overheating and to avoid overheating complaints when temperatures rise within the parameters that they are permitted to do so in line with the ventilation approach and stated guidance.

5.7 Commentary on analysis and findings

In line with the London Plan Cooling Hierarchy, a number of assessments were completed.

An initial passive scenario using openable windows was undertaken, the TM59 results of which are in Appendix A. As can be seen from these results, despite the high performance building fabric the majority of areas fail the assessment. This is driven by a number of factors, including the location and weather data to be used, as well as the restricted openings utilised for safety and security given the nature of the building. It should also be noted, as identified at planning stage, that due to the location and noise constraints openable windows should not be relied upon for thermal comfort regardless.

To this end, a further assessment was undertaken using closed windows and mechanical ventilation (i.e. local MVHR units). The model was set utilising a background rate in line with Part F requirements, boosted to 4 air changes on rise in temperature within the space, which was felt to be the highest rate practicable to be achieved without further introducing draft or mechanical noise implications. The TM59 results of this assessment are in Appendix B. As can be seen from these results, the majority of areas still fail the assessment.

Further assessments using this solution were undertaken using the DSY2 and DSY3 weather files, which are provided in Appendix C and D respectively – these showed increasing failures, reinforcing the proposal for active cooling to the spaces.

The TM52 and TM59 results for the final solution as proposed are provided in Appendices E and F respectively. Using the constructions and servicing noted, which represents the building as proposed, all appropriate areas achieve compliance with both CIBSE TM52 and TM59, and therefore Part O requirements on this basis.

Within the care home, all main spaces (bedrooms, day spaces etc) are all cooled, which greatly aids the operation of the building as a whole. As remaining areas such as landlocked offices, corridors etc. are also mechanically ventilated the building performs very well. As a result, the small number of areas which are naturally ventilated perform well with no additional servicing or boost requirements needed.

Within the apartments, again the main bedroom and living spaces are all comfort cooled resulting in good thermal comfort results.

It is important to note, the design summer year is a design tool established from a series of peak years, and may not represent average conditions. Using average weather data such as the TRY the results under typical operation and conditions would be significantly better.

It should be highlighted that to promote comfortable conditions in all scenarios the residents and staff of the building will need to actively support the building by ensuring windows, internal doors etc. are opened at a reasonable juncture or cooling is initiated as required. Where mechanical ventilation is provided to mitigate overheating it is important for the building users and resident's expectations to be managed, and for them to understand that even though the building complies with recognised comfort criteria, there will be times where temperatures are exceeded as a result of outside weather factors. This assessment has been based on the assumption that windows will be closed and demonstrates compliance using the mechanical ventilation only, however the residents and staff will have flexibility to open windows to further aid comfort and mitigate the space conditions as they so wish.

Given the failures using the DSY 2 and 3 scenarios, it is expected that the 2050 and future weather data assessments would demonstrate similar or worse failures. As active cooling is proposed, thermal comfort will be managed through this at all points in the future. Given the expected life expectancy of such systems, it is expected these will be replaced by this juncture, at which point a review of capacity and loads against the prevailing weather data/accepted conventions can be completed at the point these are installed. It is expected systems will be replaced like for like using the same or similar solutions, following the same services routes for feasibility. Given this is a managed facility, it will be the building owner or manager which will undertake this exercise at the point plant needs to be replaced, ensuring the responsibility for maintaining comfort going forward is not incumbent on the resident or occupier.

Appendix A - CIBSE TM59 Results (DSY1/Openable Windows)

Natural Ventilation Overheating Results

Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms	Result
Apt1 Bedroom 1	Bedroom	3672	110	30	3285	32	67	Fail
Apt1 Bedroom 2	Bedroom	3672	110	53	3285	32	79	Fail
Apt1 Bedroom 3	Bedroom	3672	110	73	3285	32	96	Fail
Apt1 Lounge	Living Room / Kitchen	2142	64	559	N/A	N/A	N/A	Fail
Apt2 Bedroom 1	Bedroom	3672	110	34	3285	32	26	Pass
Apt2 Bedroom 2	Bedroom	3672	110	9	3285	32	53	Fail
Apt2 Lounge	Living Room / Kitchen	2142	64	62	N/A	N/A	N/A	Pass
Apt3 Bedroom 1	Bedroom	3672	110	67	3285	32	70	Fail
Apt3 Lounge	Living Room / Kitchen	2142	64	69	N/A	N/A	N/A	Fail
Apt4 Bedroom 1	Bedroom	3672	110	28	3285	32	16	Pass
Apt4 Bedroom 2	Bedroom	3672	110	31	3285	32	69	Fail
Apt4 Lounge	Living Room / Kitchen	2142	64	59	N/A	N/A	N/A	Pass
Apt5 Bedroom 1	Bedroom	3672	110	42	3285	32	63	Fail
Apt5 Bedroom 2	Bedroom	3672	110	38	3285	32	62	Fail
Apt5 Lounge	Living Room / Kitchen	2142	64	53	N/A	N/A	N/A	Pass
Apt6 Bedroom 1	Bedroom	3672	110	35	3285	32	16	Pass
Apt6 Bedroom 2	Bedroom	3672	110	37	3285	32	59	Fail
Apt6 Lounge	Living Room / Kitchen	2142	64	62	N/A	N/A	N/A	Pass

Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms	Result
Apt7 Bedroom 1	Bedroom	3672	110	38	3285	32	53	Fail
Apt7 Bedroom 2	Bedroom	3672	110	37	3285	32	50	Fail
Apt7 Lounge	Living Room / Kitchen	2142	64	47	N/A	N/A	N/A	Pass
Apt8 Bedroom 1	Bedroom	3672	110	54	3285	32	26	Pass
Apt8 Bedroom 2	Bedroom	3672	110	43	3285	32	47	Fail
Apt8 Lounge	Living Room / Kitchen	2142	64	108	N/A	N/A	N/A	Fail
Apt9 Bedroom 1	Bedroom	3672	110	51	3285	32	32	Pass
Apt9 Lounge	Living Room / Kitchen	2142	64	82	N/A	N/A	N/A	Fail
Bedroom 1	Bedroom	3672	110	0	3285	32	59	Fail
Bedroom 2	Bedroom	3672	110	870	3285	32	497	Fail
Bedroom 3	Bedroom	3672	110	1393	3285	32	637	Fail
Bedroom 4	Bedroom	3672	110	1190	3285	32	589	Fail
Bedroom 5	Bedroom	3672	110	251	3285	32	199	Fail
Bedroom 6	Bedroom	3672	110	243	3285	32	189	Fail
Bedroom 7	Bedroom	3672	110	304	3285	32	265	Fail
Bedroom 8	Bedroom	3672	110	284	3285	32	274	Fail
Bedroom 9	Bedroom	3672	110	256	3285	32	253	Fail
Bedroom 10	Bedroom	3672	110	148	3285	32	127	Fail
Bedroom 11	Bedroom	3672	110	57	3285	32	83	Fail
Bedroom 12	Bedroom	3672	110	407	3285	32	164	Fail
Bedroom 13	Bedroom	3672	110	170	3285	32	218	Fail
Bedroom 14	Bedroom	3672	110	161	3285	32	212	Fail
Bedroom 15	Bedroom	3672	110	127	3285	32	205	Fail
Bedroom 16	Bedroom	3672	110	96	3285	32	181	Fail
Bedroom 17	Bedroom	3672	110	12	3285	32	85	Fail
Bedroom 18	Bedroom	3672	110	18	3285	32	93	Fail
Bedroom 19	Bedroom	3672	110	506	3285	32	302	Fail
Bedroom 20	Bedroom	3672	110	693	3285	32	427	Fail
Bedroom 21	Bedroom	3672	110	618	3285	32	374	Fail
Bedroom 22	Bedroom	3672	110	184	3285	32	148	Fail
Bedroom 23	Bedroom	3672	110	180	3285	32	152	Fail
Bedroom 24	Bedroom	3672	110	238	3285	32	153	Fail
Bedroom 25	Bedroom	3672	110	228	3285	32	217	Fail
Bedroom 26	Bedroom	3672	110	167	3285	32	185	Fail

Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms	Result
Bedroom 27	Bedroom	3672	110	36	3285	32	29	Pass
Bedroom 28	Bedroom	3672	110	99	3285	32	71	Fail
Bedroom 29	Bedroom	3672	110	69	3285	32	85	Fail
Bedroom 30	Bedroom	3672	110	32	3285	32	73	Fail
Bedroom 31	Bedroom	3672	110	234	3285	32	127	Fail
Bedroom 32	Bedroom	3672	110	363	3285	32	235	Fail
Bedroom 33	Bedroom	3672	110	727	3285	32	291	Fail
Bedroom 34	Bedroom	3672	110	443	3285	32	348	Fail
Bedroom 35	Bedroom	3672	110	450	3285	32	354	Fail
Bedroom 36	Bedroom	3672	110	441	3285	32	356	Fail
Bedroom 37	Bedroom	3672	110	377	3285	32	313	Fail
Bedroom 38	Bedroom	3672	110	107	3285	32	174	Fail
Bedroom 39	Bedroom	3672	110	509	3285	32	300	Fail
Bedroom 40	Bedroom	3672	110	708	3285	32	431	Fail
Bedroom 41	Bedroom	3672	110	647	3285	32	390	Fail
Bedroom 42	Bedroom	3672	110	255	3285	32	196	Fail
Bedroom 43	Bedroom	3672	110	270	3285	32	217	Fail
Bedroom 44	Bedroom	3672	110	311	3285	32	181	Fail
Bedroom 45	Bedroom	3672	110	326	3285	32	273	Fail
Bedroom 46	Bedroom	3672	110	256	3285	32	226	Fail
Bedroom 47	Bedroom	3672	110	50	3285	32	35	Fail
Bedroom 48	Bedroom	3672	110	204	3285	32	140	Fail
Bedroom 49	Bedroom	3672	110	213	3285	32	182	Fail
Bedroom 50	Bedroom	3672	110	115	3285	32	153	Fail

Appendix B - CIBSE TM59 Results (DSY1/Mechanical Ventilation)

Mechanical Ventilation Overheating Results

Zone Name	Room Use	Annual Occupied Hours	Max. Exceedable Hours	Criterion 1: Number of Hours Exceeding 26 °C	Result
Bedroom 1	Bedroom	8760	262	51	Pass
Bedroom 2	Bedroom	8760	262	234	Pass
Bedroom 3	Bedroom	8760	262	296	Fail
Bedroom 4	Bedroom	8760	262	327	Fail
Bedroom 5	Bedroom	8760	262	177	Pass
Bedroom 6	Bedroom	8760	262	176	Pass
Bedroom 7	Bedroom	8760	262	153	Pass
Bedroom 8	Bedroom	8760	262	129	Pass
Bedroom 9	Bedroom	8760	262	131	Pass
Bedroom 10	Bedroom	8760	262	174	Pass
Bedroom 11	Bedroom	8760	262	170	Pass
Bedroom 12	Bedroom	8760	262	356	Fail
Bedroom 13	Bedroom	8760	262	174	Pass
Bedroom 14	Bedroom	8760	262	167	Pass
Bedroom 15	Bedroom	8760	262	156	Pass
Bedroom 16	Bedroom	8760	262	138	Pass
Bedroom 17	Bedroom	8760	262	71	Pass
Bedroom 18	Bedroom	8760	262	79	Pass
Bedroom 19	Bedroom	8760	262	243	Pass
Bedroom 20	Bedroom	8760	262	274	Fail
Bedroom 21	Bedroom	8760	262	311	Fail
Bedroom 22	Bedroom	8760	262	185	Pass
Bedroom 23	Bedroom	8760	262	190	Pass
Bedroom 24	Bedroom	8760	262	223	Pass
Bedroom 25	Bedroom	8760	262	158	Pass
Bedroom 26	Bedroom	8760	262	156	Pass
Bedroom 27	Bedroom	8760	262	200	Pass
Bedroom 28	Bedroom	8760	262	260	Pass
Bedroom 29	Bedroom	8760	262	187	Pass
Bedroom 30	Bedroom	8760	262	151	Pass
Bedroom 31	Bedroom	8760	262	256	Pass
Bedroom 32	Bedroom	8760	262	265	Fail
Bedroom 33	Bedroom	8760	262	376	Fail
Bedroom 34	Bedroom	8760	262	212	Pass
Bedroom 35	Bedroom	8760	262	203	Pass
Bedroom 36	Bedroom	8760	262	200	Pass
Bedroom 37	Bedroom	8760	262	190	Pass
Bedroom 38	Bedroom	8760	262	140	Pass
Bedroom 39	Bedroom	8760	262	246	Pass
Bedroom 40	Bedroom	8760	262	282	Fail

Bedroom 41	Bedroom	8760	262	318	Fail
Bedroom 42	Bedroom	8760	262	214	Pass
Bedroom 43	Bedroom	8760	262	209	Pass
Bedroom 44	Bedroom	8760	262	291	Fail
Bedroom 45	Bedroom	8760	262	193	Pass
Bedroom 46	Bedroom	8760	262	189	Pass
Bedroom 47	Bedroom	8760	262	247	Pass
Bedroom 48	Bedroom	8760	262	293	Fail
Bedroom 49	Bedroom	8760	262	221	Pass
Bedroom 50	Bedroom	8760	262	165	Pass
Apt1 Bedroom 1	Bedroom	8760	262	302	Fail
Apt1 Bedroom 2	Bedroom	8760	262	384	Fail
Apt1 Bedroom 3	Bedroom	8760	262	521	Fail
Apt2 Bedroom 1	Bedroom	8760	262	573	Fail
Apt2 Bedroom 2	Bedroom	8760	262	501	Fail
Apt3 Bedroom 1	Bedroom	8760	262	873	Fail
Apt4 Bedroom 1	Bedroom	8760	262	630	Fail
Apt4 Bedroom 2	Bedroom	8760	262	797	Fail
Apt5 Bedroom 1	Bedroom	8760	262	820	Fail
Apt5 Bedroom 2	Bedroom	8760	262	991	Fail
Apt6 Bedroom 1	Bedroom	8760	262	672	Fail
Apt6 Bedroom 2	Bedroom	8760	262	780	Fail
Apt7 Bedroom 1	Bedroom	8760	262	653	Fail
Apt7 Bedroom 2	Bedroom	8760	262	880	Fail
Apt8 Bedroom 1	Bedroom	8760	262	843	Fail
Apt8 Bedroom 2	Bedroom	8760	262	1012	Fail
Apt9 Bedroom 1	Bedroom	8760	262	329	Fail
Apt1 Lounge	Living Room / Kitchen	5110	153	1401	Fail
Apt2 Lounge	Living Room / Kitchen	5110	153	1356	Fail
Apt3 Lounge	Living Room / Kitchen	5110	153	1352	Fail
Apt4 Lounge	Living Room / Kitchen	5110	153	1517	Fail
Apt5 Lounge	Living Room / Kitchen	5110	153	1481	Fail
Apt6 Lounge	Living Room / Kitchen	5110	153	1529	Fail
Apt7 Lounge	Living Room / Kitchen	5110	153	1421	Fail
Apt8 Lounge	Living Room / Kitchen	5110	153	1490	Fail
Apt9 Lounge	Living Room / Kitchen	5110	153	990	Fail

Appendix C - CIBSE TM59 Results (DSY2/Mechanical Ventilation)

Mechanical Ventilation Overheating Results

Zone Name	Room Use	Annual Occupied Hours	Max. Exceedable Hours	Criterion 1: Number of Hours Exceeding 26 °C	Result
Bedroom 1	Bedroom	8760	262	136	Pass
Bedroom 2	Bedroom	8760	262	307	Fail
Bedroom 3	Bedroom	8760	262	369	Fail
Bedroom 4	Bedroom	8760	262	405	Fail
Bedroom 5	Bedroom	8760	262	241	Pass
Bedroom 6	Bedroom	8760	262	241	Pass
Bedroom 7	Bedroom	8760	262	229	Pass
Bedroom 8	Bedroom	8760	262	207	Pass
Bedroom 9	Bedroom	8760	262	212	Pass
Bedroom 10	Bedroom	8760	262	242	Pass
Bedroom 11	Bedroom	8760	262	265	Fail
Bedroom 12	Bedroom	8760	262	428	Fail
Bedroom 13	Bedroom	8760	262	271	Fail
Bedroom 14	Bedroom	8760	262	268	Fail
Bedroom 15	Bedroom	8760	262	259	Pass
Bedroom 16	Bedroom	8760	262	244	Pass
Bedroom 17	Bedroom	8760	262	169	Pass
Bedroom 18	Bedroom	8760	262	177	Pass
Bedroom 19	Bedroom	8760	262	331	Fail
Bedroom 20	Bedroom	8760	262	367	Fail
Bedroom 21	Bedroom	8760	262	394	Fail
Bedroom 22	Bedroom	8760	262	270	Fail
Bedroom 23	Bedroom	8760	262	271	Fail
Bedroom 24	Bedroom	8760	262	286	Fail
Bedroom 25	Bedroom	8760	262	245	Pass
Bedroom 26	Bedroom	8760	262	245	Pass
Bedroom 27	Bedroom	8760	262	277	Fail
Bedroom 28	Bedroom	8760	262	302	Fail
Bedroom 29	Bedroom	8760	262	251	Pass
Bedroom 30	Bedroom	8760	262	233	Pass
Bedroom 31	Bedroom	8760	262	318	Fail
Bedroom 32	Bedroom	8760	262	345	Fail
Bedroom 33	Bedroom	8760	262	439	Fail
Bedroom 34	Bedroom	8760	262	306	Fail
Bedroom 35	Bedroom	8760	262	300	Fail
Bedroom 36	Bedroom	8760	262	298	Fail
Bedroom 37	Bedroom	8760	262	285	Fail
Bedroom 38	Bedroom	8760	262	227	Pass
Bedroom 39	Bedroom	8760	262	327	Fail
Bedroom 40	Bedroom	8760	262	369	Fail

Bedroom 41	Bedroom	8760	262	397	Fail
Bedroom 42	Bedroom	8760	262	285	Fail
Bedroom 43	Bedroom	8760	262	284	Fail
Bedroom 44	Bedroom	8760	262	336	Fail
Bedroom 45	Bedroom	8760	262	273	Fail
Bedroom 46	Bedroom	8760	262	274	Fail
Bedroom 47	Bedroom	8760	262	311	Fail
Bedroom 48	Bedroom	8760	262	335	Fail
Bedroom 49	Bedroom	8760	262	287	Fail
Bedroom 50	Bedroom	8760	262	247	Pass
Apt1 Bedroom 1	Bedroom	8760	262	401	Fail
Apt1 Bedroom 2	Bedroom	8760	262	488	Fail
Apt1 Bedroom 3	Bedroom	8760	262	644	Fail
Apt2 Bedroom 1	Bedroom	8760	262	717	Fail
Apt2 Bedroom 2	Bedroom	8760	262	639	Fail
Apt3 Bedroom 1	Bedroom	8760	262	1029	Fail
Apt4 Bedroom 1	Bedroom	8760	262	767	Fail
Apt4 Bedroom 2	Bedroom	8760	262	927	Fail
Apt5 Bedroom 1	Bedroom	8760	262	949	Fail
Apt5 Bedroom 2	Bedroom	8760	262	1146	Fail
Apt6 Bedroom 1	Bedroom	8760	262	803	Fail
Apt6 Bedroom 2	Bedroom	8760	262	912	Fail
Apt7 Bedroom 1	Bedroom	8760	262	800	Fail
Apt7 Bedroom 2	Bedroom	8760	262	1035	Fail
Apt8 Bedroom 1	Bedroom	8760	262	996	Fail
Apt8 Bedroom 2	Bedroom	8760	262	1186	Fail
Apt9 Bedroom 1	Bedroom	8760	262	421	Fail
Apt1 Study	Bedroom	8760	262	538	Fail
Apt1 Lounge	Living Room / Kitchen	5110	153	1466	Fail
Apt2 Lounge	Living Room / Kitchen	5110	153	1426	Fail
Apt3 Lounge	Living Room / Kitchen	5110	153	1447	Fail
Apt4 Lounge	Living Room / Kitchen	5110	153	1604	Fail
Apt5 Lounge	Living Room / Kitchen	5110	153	1567	Fail
Apt6 Lounge	Living Room / Kitchen	5110	153	1610	Fail
Apt7 Lounge	Living Room / Kitchen	5110	153	1516	Fail
Apt8 Lounge	Living Room / Kitchen	5110	153	1562	Fail
Apt9 Lounge	Living Room / Kitchen	5110	153	1113	Fail

Appendix D - CIBSE TM59 Results (DSY3/Mechanical Ventilation)

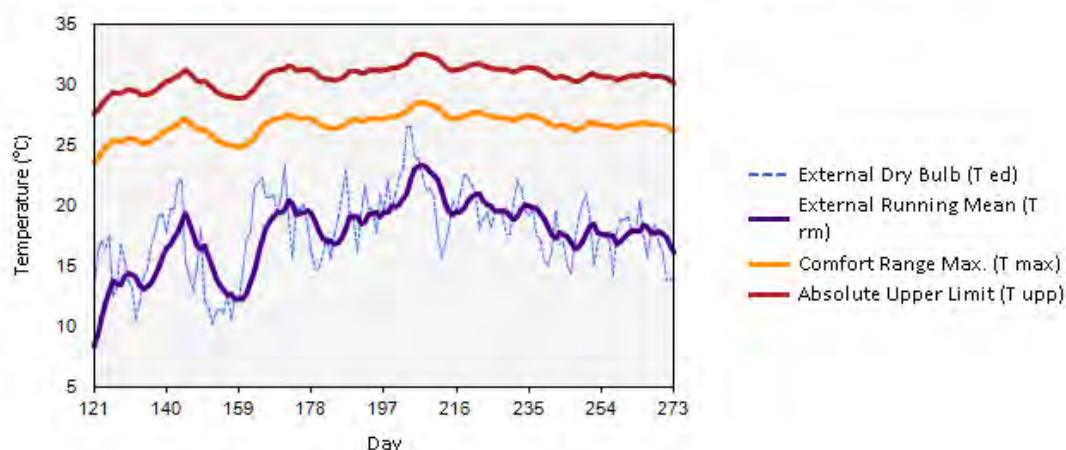
Mechanical Ventilation Overheating Results

Zone Name	Room Use	Annual Occupied Hours	Max. Exceedable Hours	Criterion 1: Number of Hours Exceeding 26 °C	Result
Bedroom 1	Bedroom	8760	262	192	Pass
Bedroom 2	Bedroom	8760	262	363	Fail
Bedroom 3	Bedroom	8760	262	416	Fail
Bedroom 4	Bedroom	8760	262	458	Fail
Bedroom 5	Bedroom	8760	262	311	Fail
Bedroom 6	Bedroom	8760	262	314	Fail
Bedroom 7	Bedroom	8760	262	294	Fail
Bedroom 8	Bedroom	8760	262	268	Fail
Bedroom 9	Bedroom	8760	262	277	Fail
Bedroom 10	Bedroom	8760	262	307	Fail
Bedroom 11	Bedroom	8760	262	316	Fail
Bedroom 12	Bedroom	8760	262	485	Fail
Bedroom 13	Bedroom	8760	262	361	Fail
Bedroom 14	Bedroom	8760	262	344	Fail
Bedroom 15	Bedroom	8760	262	322	Fail
Bedroom 16	Bedroom	8760	262	311	Fail
Bedroom 17	Bedroom	8760	262	237	Pass
Bedroom 18	Bedroom	8760	262	243	Pass
Bedroom 19	Bedroom	8760	262	399	Fail
Bedroom 20	Bedroom	8760	262	431	Fail
Bedroom 21	Bedroom	8760	262	460	Fail
Bedroom 22	Bedroom	8760	262	348	Fail
Bedroom 23	Bedroom	8760	262	357	Fail
Bedroom 24	Bedroom	8760	262	377	Fail
Bedroom 25	Bedroom	8760	262	320	Fail
Bedroom 26	Bedroom	8760	262	322	Fail
Bedroom 27	Bedroom	8760	262	353	Fail
Bedroom 28	Bedroom	8760	262	375	Fail
Bedroom 29	Bedroom	8760	262	306	Fail
Bedroom 30	Bedroom	8760	262	281	Fail
Bedroom 31	Bedroom	8760	262	359	Fail
Bedroom 32	Bedroom	8760	262	382	Fail
Bedroom 33	Bedroom	8760	262	493	Fail
Bedroom 34	Bedroom	8760	262	369	Fail
Bedroom 35	Bedroom	8760	262	364	Fail
Bedroom 36	Bedroom	8760	262	361	Fail
Bedroom 37	Bedroom	8760	262	345	Fail
Bedroom 38	Bedroom	8760	262	291	Fail
Bedroom 39	Bedroom	8760	262	387	Fail
Bedroom 40	Bedroom	8760	262	424	Fail

Bedroom 41	Bedroom	8760	262	447	Fail
Bedroom 42	Bedroom	8760	262	348	Fail
Bedroom 43	Bedroom	8760	262	351	Fail
Bedroom 44	Bedroom	8760	262	411	Fail
Bedroom 45	Bedroom	8760	262	336	Fail
Bedroom 46	Bedroom	8760	262	336	Fail
Bedroom 47	Bedroom	8760	262	371	Fail
Bedroom 48	Bedroom	8760	262	400	Fail
Bedroom 49	Bedroom	8760	262	336	Fail
Bedroom 50	Bedroom	8760	262	297	Fail
Apt1 Bedroom 1	Bedroom	8760	262	482	Fail
Apt1 Bedroom 2	Bedroom	8760	262	578	Fail
Apt1 Bedroom 3	Bedroom	8760	262	711	Fail
Apt2 Bedroom 1	Bedroom	8760	262	773	Fail
Apt2 Bedroom 2	Bedroom	8760	262	721	Fail
Apt3 Bedroom 1	Bedroom	8760	262	1024	Fail
Apt4 Bedroom 1	Bedroom	8760	262	819	Fail
Apt4 Bedroom 2	Bedroom	8760	262	959	Fail
Apt5 Bedroom 1	Bedroom	8760	262	970	Fail
Apt5 Bedroom 2	Bedroom	8760	262	1140	Fail
Apt6 Bedroom 1	Bedroom	8760	262	844	Fail
Apt6 Bedroom 2	Bedroom	8760	262	936	Fail
Apt7 Bedroom 1	Bedroom	8760	262	824	Fail
Apt7 Bedroom 2	Bedroom	8760	262	1038	Fail
Apt8 Bedroom 1	Bedroom	8760	262	999	Fail
Apt8 Bedroom 2	Bedroom	8760	262	1147	Fail
Apt9 Bedroom 1	Bedroom	8760	262	486	Fail
Apt1 Lounge	Living Room / Kitchen	5110	153	1242	Fail
Apt2 Lounge	Living Room / Kitchen	5110	153	1208	Fail
Apt3 Lounge	Living Room / Kitchen	5110	153	1226	Fail
Apt4 Lounge	Living Room / Kitchen	5110	153	1363	Fail
Apt5 Lounge	Living Room / Kitchen	5110	153	1299	Fail
Apt6 Lounge	Living Room / Kitchen	5110	153	1364	Fail
Apt7 Lounge	Living Room / Kitchen	5110	153	1250	Fail
Apt8 Lounge	Living Room / Kitchen	5110	153	1316	Fail
Apt9 Lounge	Living Room / Kitchen	5110	153	970	Fail

Appendix E - Adaptive Overheating Report Results (TM52) FINAL STRATEGY

Adaptive Summer Temperatures for London_LWC_DSY1



The adaptive overheating assessment tests rooms against three criteria. If a room fails any two of the three criteria then it is said to overheat.

1. The first criterion sets a limit for the number of hours that the operative temperature exceeds the comfort temperature by 1°C or more during the occupied hours over the summer period (1st May to 30th September).
2. The second criterion deals with the severity of the overheating within any one day. This sets a daily limit for acceptability.
3. The third criterion sets an absolute maximum daily temperature for the room.

Project Details

Building Designer File (.tbd): HighgateTC.tbd
Simulation Results File (.tsd): HighgateTC.tsd
Date: 21 January 2026
Building Category: Category I
Report Criteria: TM52

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
Comms 1	1224	36	0	0.0	0	Pass
Ensuite 1	306	9	0	0.0	0	Pass
Ensuite 2	306	9	0	0.0	0	Pass
Ensuite 3	306	9	0	0.0	0	Pass
Ensuite 4	306	9	0	0.0	0	Pass
Ensuite 5	306	9	0	0.0	0	Pass
Ensuite 6	306	9	0	0.0	0	Pass
Ensuite 7	306	9	0	0.0	0	Pass
Ensuite 8	306	9	0	0.0	0	Pass
Ensuite 9	306	9	0	0.0	0	Pass
Ensuite 10	306	9	0	0.0	0	Pass

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
Ensuite 11	306	9	0	0.0	0	Pass
Ensuite 12	306	9	0	0.0	0	Pass
Ensuite 13	306	9	0	0.0	0	Pass
Ensuite 14	306	9	0	0.0	0	Pass
Ensuite 15	306	9	0	0.0	0	Pass
Ensuite 16	306	9	0	0.0	0	Pass
Ensuite 17	306	9	0	0.0	0	Pass
Ensuite 18	306	9	0	0.0	0	Pass
Ensuite 19	306	9	0	0.0	0	Pass
Ensuite 20	306	9	0	0.0	0	Pass
Ensuite 21	306	9	0	0.0	0	Pass
Ensuite 22	306	9	0	0.0	0	Pass
Ensuite 23	306	9	0	0.0	0	Pass
Ensuite 24	306	9	0	0.0	0	Pass
Ensuite 25	306	9	0	0.0	0	Pass
Ensuite 26	306	9	0	0.0	0	Pass
Ensuite 27	306	9	0	0.0	0	Pass
Ensuite 28	306	9	0	0.0	0	Pass
Ensuite 29	306	9	0	0.0	0	Pass
Ensuite 30	306	9	0	0.0	0	Pass
Ensuite 31	306	9	0	0.0	0	Pass
Ensuite 32	306	9	0	0.0	0	Pass
Ensuite 33	306	9	0	0.0	0	Pass
Ensuite 34	306	9	0	0.0	0	Pass
Ensuite 35	306	9	0	0.0	0	Pass
Ensuite 36	306	9	0	0.0	0	Pass
Ensuite 37	306	9	0	0.0	0	Pass
Ensuite 38	306	9	0	0.0	0	Pass
Ensuite 39	306	9	0	0.0	0	Pass
Ensuite 40	306	9	0	0.0	0	Pass
Ensuite 41	306	9	0	0.0	0	Pass
Ensuite 42	306	9	0	0.0	0	Pass
Ensuite 43	306	9	0	0.0	0	Pass
Ensuite 44	306	9	0	0.0	0	Pass
Ensuite 45	306	9	0	0.0	0	Pass
Ensuite 46	306	9	0	0.0	0	Pass
Ensuite 47	306	9	1	1.0	0	Pass
Ensuite 48	306	9	0	0.0	0	Pass
Ensuite 49	306	9	0	0.0	0	Pass
Ensuite 50	306	9	0	0.0	0	Pass
Bedroom 1	3672	110	0	0.0	0	Pass
Bedroom 2	3672	110	0	0.0	0	Pass
Bedroom 3	3672	110	0	0.0	0	Pass

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
Bedroom 4	3672	110	0	0.0	0	Pass
Bedroom 5	3672	110	0	0.0	0	Pass
Bedroom 6	3672	110	0	0.0	0	Pass
Bedroom 7	3672	110	0	0.0	0	Pass
Bedroom 8	3672	110	0	0.0	0	Pass
Bedroom 9	3672	110	0	0.0	0	Pass
Bedroom 10	3672	110	0	0.0	0	Pass
Bedroom 11	3672	110	0	0.0	0	Pass
Bedroom 12	3672	110	0	0.0	0	Pass
Bedroom 13	3672	110	0	0.0	0	Pass
Bedroom 14	3672	110	0	0.0	0	Pass
Bedroom 15	3672	110	0	0.0	0	Pass
Bedroom 16	3672	110	0	0.0	0	Pass
Bedroom 17	3672	110	0	0.0	0	Pass
Bedroom 18	3672	110	0	0.0	0	Pass
Bedroom 19	3672	110	0	0.0	0	Pass
Bedroom 20	3672	110	0	0.0	0	Pass
Bedroom 21	3672	110	0	0.0	0	Pass
Bedroom 22	3672	110	0	0.0	0	Pass
Bedroom 23	3672	110	0	0.0	0	Pass
Bedroom 24	3672	110	0	0.0	0	Pass
Bedroom 25	3672	110	0	0.0	0	Pass
Bedroom 26	3672	110	0	0.0	0	Pass
Bedroom 27	3672	110	0	0.0	0	Pass
Bedroom 28	3672	110	0	0.0	0	Pass
Bedroom 29	3672	110	0	0.0	0	Pass
Bedroom 30	3672	110	0	0.0	0	Pass
Bedroom 31	3672	110	0	0.0	0	Pass
Bedroom 32	3672	110	0	0.0	0	Pass
Bedroom 33	3672	110	0	0.0	0	Pass
Bedroom 34	3672	110	0	0.0	0	Pass
Bedroom 35	3672	110	0	0.0	0	Pass
Bedroom 36	3672	110	0	0.0	0	Pass
Bedroom 37	3672	110	0	0.0	0	Pass
Bedroom 38	3672	110	0	0.0	0	Pass
Bedroom 39	3672	110	0	0.0	0	Pass
Bedroom 40	3672	110	0	0.0	0	Pass
Bedroom 41	3672	110	0	0.0	0	Pass
Bedroom 42	3672	110	0	0.0	0	Pass
Bedroom 43	3672	110	0	0.0	0	Pass
Bedroom 44	3672	110	0	0.0	0	Pass
Bedroom 45	3672	110	0	0.0	0	Pass
Bedroom 46	3672	110	0	0.0	0	Pass

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
Bedroom 47	3672	110	0	0.0	0	Pass
Bedroom 48	3672	110	0	0.0	0	Pass
Bedroom 49	3672	110	0	0.0	0	Pass
Bedroom 50	3672	110	0	0.0	0	Pass
Staff Room	2295	68	52	13.0	0	Pass
Changing 1 HydroM	306	9	1	1.0	0	Pass
Changing 2 HydroF	306	9	1	1.0	0	Pass
Changing 3 Kitchen	306	9	0	0.0	0	Pass
Changing 4 F	306	9	0	0.0	0	Pass
Changing 5 M	306	9	1	1.0	0	Pass
Changing 6	306	9	2	1.0	0	Pass
Circulation 1 Foyer	2295	68	0	0.0	0	Pass
Circulation 2	2448	73	0	0.0	0	Pass
Circulation 3	2448	73	0	0.0	0	Pass
Circulation 4	2448	73	0	0.0	0	Pass
Circulation 5	2448	73	0	0.0	0	Pass
Circulation 6	2448	73	0	0.0	0	Pass
Circulation 7	2448	73	0	0.0	0	Pass
Circulation 8	2448	73	0	0.0	0	Pass
Circulation 9	2448	73	0	0.0	0	Pass
Circulation 10	2448	73	0	0.0	0	Pass
Circulation 11	2448	73	0	0.0	0	Pass
Circulation 12	2448	73	0	0.0	0	Pass
Circulation 13	2448	73	0	0.0	0	Pass
Circulation 14	2448	73	0	0.0	0	Pass
Circulation 15	2448	73	0	0.0	0	Pass
Lobby	0	0	0	0.0	0	Pass
Meet&Greet	2295	68	0	0.0	0	Pass
Cafe	2295	68	0	0.0	0	Pass
Restaurant	2295	68	0	0.0	0	Pass
Private Dining	2295	68	0	0.0	0	Pass
Quiet Lounge	2295	68	0	0.0	0	Pass
Gym/Physio	2295	68	0	0.0	0	Pass
Multifunction	2295	68	0	0.0	0	Pass
Lounge FF	2295	68	0	0.0	0	Pass
Wellness Lounge	2295	68	0	0.0	0	Pass
Lounge SF	2295	68	0	0.0	0	Pass
Kitchen	2601	78	0	0.0	0	Pass
Finishing Kitchen	1836	55	0	0.0	0	Pass
Conuslt Room 1	1836	55	0	0.0	0	Pass
Conuslt Room 2	1836	55	0	0.0	0	Pass
Conuslt Room 3	1836	55	0	0.0	0	Pass
Conuslt Room 4	1836	55	0	0.0	0	Pass

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
Conuslt Room 5 Prep	1683	50	16	5.0	0	Pass
Cleaners 1	0	0	0	0.0	0	Pass
Cleaners 2	0	0	0	0.0	0	Pass
Cleaners 3	0	0	0	0.0	0	Pass
Laundry	1836	55	0	0.0	0	Pass
Sluice 1	2448	73	0	0.0	0	Pass
Consult Office	1836	55	0	0.0	0	Pass
Managers Office	1836	55	0	0.0	0	Pass
Admin Office	1836	55	0	0.0	0	Pass
Photocopy	1836	55	24	9.0	0	Pass
Chef Office	1836	55	23	9.0	0	Pass
GF Office	1836	55	0	0.0	0	Pass
Cryo	1683	50	0	0.0	0	Pass
Red Light Room	1683	50	0	0.0	0	Pass
Hairdresser	1836	55	0	0.0	0	Pass
FF Office	1836	55	15	7.0	0	Pass
SF Office	1836	55	0	0.0	0	Pass
Nurse Station 1	1836	55	0	0.0	0	Pass
Nurse Station 2	1836	55	1	1.0	0	Pass
Nurse Station 3	1836	55	0	0.0	0	Pass
Circ_BoH 1	2448	73	0	0.0	0	Pass
Circ_BoH 2	2448	73	0	0.0	0	Pass
Circ_BoH 3	2448	73	0	0.0	0	Pass
Circ_BoH 4	2448	73	0	0.0	0	Pass
Circ_BoH 5	2448	73	0	0.0	0	Pass
Circ_BoH 6	2448	73	0	0.0	0	Pass
Plant 2	0	0	0	0.0	0	Pass
Plant 3 Tank	0	0	0	0.0	0	Pass
Med Store 1	1989	59	0	0.0	0	Pass
Med Store 2	1989	59	0	0.0	0	Pass
Med Store 3	1989	59	0	0.0	0	Pass
Reception	1683	50	0	0.0	0	Pass
Store 1 Kitchen	0	0	0	0.0	0	Pass
Store 2	0	0	0	0.0	0	Pass
Store 3	0	0	0	0.0	0	Pass
Store 4	0	0	0	0.0	0	Pass
Store 5	0	0	0	0.0	0	Pass
Store 6	0	0	0	0.0	0	Pass
Store 7	0	0	0	0.0	0	Pass
Store 8	0	0	0	0.0	0	Pass
Store 9	0	0	0	0.0	0	Pass
WC 1	2448	73	0	0.0	0	Pass
WC 2	2448	73	0	0.0	0	Pass

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
WC 3	2448	73	0	0.0	0	Pass
WC 4	2448	73	0	0.0	0	Pass
WC 5	2448	73	5	3.0	0	Pass
WC 6	2448	73	8	4.0	0	Pass
WC 7	2448	73	19	9.0	0	Pass
Stair 1	2448	73	0	0.0	0	Pass
Stair 2	2448	73	0	0.0	0	Pass
Apt1 Bedroom 1	3672	110	0	0.0	0	Pass
Apt1 Bedroom 2	3672	110	0	0.0	0	Pass
Apt1 Bedroom 3	3672	110	0	0.0	0	Pass
Apt2 Bedroom 1	3672	110	0	0.0	0	Pass
Apt2 Bedroom 2	3672	110	0	0.0	0	Pass
Apt3 Bedroom 1	3672	110	0	0.0	0	Pass
Apt4 Bedroom 1	3672	110	0	0.0	0	Pass
Apt4 Bedroom 2	3672	110	0	0.0	0	Pass
Apt5 Bedroom 1	3672	110	0	0.0	0	Pass
Apt5 Bedroom 2	3672	110	0	0.0	0	Pass
Apt6 Bedroom 1	3672	110	0	0.0	0	Pass
Apt6 Bedroom 2	3672	110	0	0.0	0	Pass
Apt7 Bedroom 1	3672	110	0	0.0	0	Pass
Apt7 Bedroom 2	3672	110	0	0.0	0	Pass
Apt8 Bedroom 1	3672	110	0	0.0	0	Pass
Apt8 Bedroom 2	3672	110	0	0.0	0	Pass
Apt9 Bedroom 1	3672	110	0	0.0	0	Pass
Apt1 Study	3672	110	0	0.0	0	Pass
Apt1 Lounge	3672	110	0	0.0	0	Pass
Apt2 Lounge	3672	110	0	0.0	0	Pass
Apt3 Lounge	3672	110	0	0.0	0	Pass
Apt4 Lounge	3672	110	0	0.0	0	Pass
Apt5 Lounge	3672	110	0	0.0	0	Pass
Apt6 Lounge	3672	110	0	0.0	0	Pass
Apt7 Lounge	3672	110	0	0.0	0	Pass
Apt8 Lounge	3672	110	0	0.0	0	Pass
Apt9 Lounge	3672	110	0	0.0	0	Pass
Apt1 Bathroom	306	9	0	0.0	0	Pass
Apt2 Bathroom	306	9	0	0.0	0	Pass
Apt3 Bathroom	306	9	0	0.0	0	Pass
Apt4 Bathroom	306	9	0	0.0	0	Pass
Apt5 Bathroom	306	9	0	0.0	0	Pass
Apt6 Bathroom	306	9	0	0.0	0	Pass
Apt7 Bathroom	306	9	0	0.0	0	Pass
Apt8 Bathroom	306	9	0	0.0	0	Pass
Apt9 Bathroom	306	9	0	0.0	0	Pass

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
Apt1 Ensuite	306	9	0	0.0	0	Pass
Apt2 Ensuite	306	9	0	0.0	0	Pass
Apt4 Ensuite	306	9	0	0.0	0	Pass
Apt6 Ensuite	306	9	0	0.0	0	Pass
Apt1 Hall	2448	73	0	0.0	0	Pass
Apt2 Hall	2448	73	0	0.0	0	Pass
Apt3 Hall	2448	73	0	0.0	0	Pass
Apt4 Hall	2448	73	0	0.0	0	Pass
Apt51 Hall	2448	73	0	0.0	0	Pass
Apt6 Hall	2448	73	0	0.0	0	Pass
Apt7 Hall	2448	73	0	0.0	0	Pass
Apt8 Hall	2448	73	0	0.0	0	Pass
Apt9 Hall	2448	73	0	0.0	0	Pass
Apartment Lobby	0	0	0	0.0	0	Pass
Apartment Stair	2448	73	6	6.0	0	Pass
Apartment CircB	2448	73	0	0.0	0	Pass
Apartment CircG	2448	73	0	0.0	0	Pass
Apartment CircF	2448	73	0	0.0	0	Pass
Apartment CircS	2448	73	0	0.0	0	Pass
Apartment CircT	2448	73	0	0.0	0	Pass
Apt1 Store	0	0	0	0.0	0	Pass
Apt2 Store	0	0	0	0.0	0	Pass
Apt3 Store	0	0	0	0.0	0	Pass
Apt4 Store	0	0	0	0.0	0	Pass
Apt5 Store	0	0	0	0.0	0	Pass
Apt6 Store	0	0	0	0.0	0	Pass
Apt7 Store	0	0	0	0.0	0	Pass
Apt8 Store	0	0	0	0.0	0	Pass
Apt9 Store	0	0	0	0.0	0	Pass

Appendix B - CIBSE TM59 Results FINAL STRATEGY

Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms	Result
Apt1 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Apt1 Bedroom 2	Bedroom	3672	110	0	3285	32	0	Pass
Apt1 Bedroom 3	Bedroom	3672	110	0	3285	32	0	Pass
Apt1 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Apt1 Study	Bedroom	3672	110	0	3285	32	0	Pass
Apt2 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Apt2 Bedroom 2	Bedroom	3672	110	0	3285	32	0	Pass
Apt2 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Apt3 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Apt3 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Apt4 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Apt4 Bedroom 2	Bedroom	3672	110	0	3285	32	0	Pass
Apt4 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Apt5 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Apt5 Bedroom 2	Bedroom	3672	110	0	3285	32	0	Pass
Apt5 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Apt6 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Apt6 Bedroom 2	Bedroom	3672	110	0	3285	32	0	Pass
Apt6 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Apt7 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass

Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms	Result
Apt7 Bedroom 2	Bedroom	3672	110	0	3285	32	0	Pass
Apt7 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Apt8 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Apt8 Bedroom 2	Bedroom	3672	110	0	3285	32	0	Pass
Apt8 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Apt9 Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Apt9 Lounge	Living Room / Kitchen	3672	110	0	N/A	N/A	N/A	Pass
Bedroom 1	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 2	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 3	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 4	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 5	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 6	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 7	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 8	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 9	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 10	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 11	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 12	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 13	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 14	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 15	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 16	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 17	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 18	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 19	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 20	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 21	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 22	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 23	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 24	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 25	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 26	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 27	Bedroom	3672	110	0	3285	32	0	Pass

Zone Name	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms	Result
Bedroom 28	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 29	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 30	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 31	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 32	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 33	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 34	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 35	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 36	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 37	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 38	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 39	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 40	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 41	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 42	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 43	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 44	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 45	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 46	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 47	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 48	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 49	Bedroom	3672	110	0	3285	32	0	Pass
Bedroom 50	Bedroom	3672	110	0	3285	32	0	Pass